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L7: Entry 7 of 66 File: USPT Nov 23, 1999

DOCUMENT-IDENTIFIER: US 5989584 A
TITLE: CCK antibodies used to improve feed efficiency

ABPL:
A method of increasing food efficiency in both avians and mammals by using antibodies to gut peptides such as choleocystokinin to elicit a biological response which decreases gastrointestinal motility, reduces satiety or improves feed efficiency.

BSPR:
The effects of CCK in domestic fowls is well known (Savory et al, 1981). CCK represents a polypeptide hormone which is released when food enters the small intestine. The presence of CCK in the gut mucosa alters gastrointestinal (GI) motility. The gizzard controls the rate in which food travels through the intestine and CCK, which is normally released after a meal is consumed, causes a decrease in gizzard contraction and an increase in intestinal contraction. This results in less time for the absorption of food and nutrients in the intestinal tract. The inventors have found that transferring CCK antibody to poultry increases feed efficiency. In other words, the birds gain more weight per pound of food.

BSPR:
This invention also relates to a specific antibody containing substance produced from the egg of a hen immunized against a selected antigen wherein the substance is mixed with feed and subsequently fed to poultry to elicit altered but improved physiological response. Antibodies to CCK can be produced in laying hens, passed to the yolk, harvested from the yolk or fed as dried yolk, and used as a feed additive for improving feed efficiency in poultry has also not been previously appreciated in the art.

BSPR:
A second advantage to the present invention is that the CCK antibodies neutralize CCK but have no known harmful side affects and do not appear to affect meat quality. Also, the cost of utilizing this invention, even on a large scale, is relatively low since only 0.1 to 1 CCK antibody-containing egg is required per eight pounds of feed.

BSPR:
In addition, using the method of feeding the antibody to domesticated animals is relatively low in labor costs since the antibody can simply be mixed with feed and thus, not every

individual animal must be injected with the antibody. Also, there is no need to separate or isolate the antibody from the egg since whole egg or yolk can simply be spray dried and fed directly.

BSPR:
CCK also has the same effects of increased GI motility and satiety inhibition in mammals (Pekas and Trout, 1990). It is a well known fact that mammalian species passively transfer antibodies to their progeny as do avians and that mammals respond to CCK autoimmunization as do avians. The dam's antibodies are also identical to those passively transferred to the progeny in avians as well as mammals. Similarly, feeding raw soybean exerts analogous increases in CCK production in mammals as it does in birds (Weller et al, 1990; Chohen et al, 1993; Can J An Sci 73; 401). Therefore, based on the aforementioned facts, the protective effects of actively fed and passively transferred CCK antibodies against satiety and poor feed conversion resulting from CCK observed in avians would also be seen in mammals. Using CCK on various livestock such as cattle and swine would drastically increase their final weight using the same amount of animal meal. Thus the costs to produce an animal of market size is decreased and this would have an enormously beneficial effect on the livestock industry.

BSPR:
Either purified CCK or synthesized CCK peptide can be used. Well known means in the art can be used for purifying the CCK peptide such as fractionization, chromatography, precipitation or extraction. However, CCK should be conjugated with a carrier or foreign protein for use as the antigen. CCK alone has a molecular weight less than 1,500 Daltons. In order to invoke an immune response, a molecular weight of at least 10,000 Daltons is required. Therefore, the CCK peptide should be conjugated with a carrier protein with a molecular weight of approximately 8,000 Daltons or more in order for the conjugate to elicit an immune response. Carriers include a wide variety of conventionally known substances but commonly entail bovine gamma globulin or keyhole limpet hemocyanin.

BSPR:
A third mode of this invention is via inoculation. CCK antibodies can be directly injected into a target animal in order to elicit the desired response of satiety and improved feed conversion.

DEPL:
Summary: Broiler chicks were purchased from an outside vendor and fed various antibodies to peptides of GI tract to establish any type of phenomena that may occur related to body weight and/or feed conversion.

DEPC:
EFFECTS OF PASSIVELY TRANSFERRING CCK ANTIBODY IN PREVENTING THE NEGATIVE EFFECTS OF FEEDING RAW SOYBEANS ON FEED CONVERSION

DETL:

							Results:	(lbs)	(kg) 0-2
0-2 Treat-	2 week	(kg)	(kg) 0-2	Feed	feed/kg	feed/	ment*	wt	0-2

gain adg consumption body wt. gain

_____ Control 66.3 10.4 0.741 19.31 0.638 1.870 0.25 63.8 9.8 0.703 19.19 0.663 1.959 0.75 64.7 10.7 0.763 19.43 0.661 1.821 2.5 68.3 11.1 0.790 20.66 0.660 1.878 _____ *grams of egg yolk antibody powder/kg feed

CLPR:
2. The feed of claim 1 further including eggs of avians containing said antibody.

CLPR:
9. The feed of claim 8 further including eggs of avians containing said antibody.

CLPR:
16. The feed of claim 15 further including eggs of avians containing said antibody.

CLPR:
21. The feed of claim 20 wherein said mammal is selected from the group consisting of a porcine, a bovine, an ovine, or a caprine.

CLPR:
24. An animal feed for regulating feeding or growth behavior in an animal having a gut, the feed comprising an ingestible carrier and a composition comprising an antibody that binds to an antigen natively present in the gut to neutralize and prevent the antigen from binding to specific cell receptors, in an amount effective to regulate feeding or growth behavior in the animal.

CLPR:
25. The feed of claim 24 wherein the antibody comprises a gut peptide antibody.

CLPR:
26. The feed of claim 25 wherein the gut peptide antibody is selected from the group consisting of cholecystokinin, bombesin, neuropeptide Y, gastrin and somatostatin antibodies.

CLPR:
27. The feed of claim 25 wherein the gut peptide antibody is cholecystokinin antibody.

CLPR:
29. The feed of claim 24 wherein said composition is formulated for an animal selected from the group consisting of an avian, a porcine, a bovine, an ovine or a caprine.

CLPR:
30. An animal feed for regulating feeding or growth behavior in an animal having a gut, the feed comprising an ingestible carrier and a gut peptide antibody that binds to a gut peptide in the gut to neutralize and prevent the gut peptide from binding to specific cell receptors, in a concentration effective to regulate feeding or growth behavior in the animal.

CLPR:
31. The feed of claim 30 wherein the gut peptide antibody is selected from the group consisting of cholecystokinin, bombesin, neuropeptide Y, gastrin and somatostatin antibodies.

CLPR:
32. The feed of claim 30 wherein the gut peptide antibody is cholecystokinin antibody.

CLPR:
33. The feed of claim 30 wherein said feed is formulated for an animal selected from the group consisting of an avian, a porcine, a bovine, an ovine or a caprine.